WHAT IS CLAIMED IS:

1. An isolated polynucleotide selected from the group consisting of:
a) A nucleotide sequence encoding the polypeptide of SEQ ID NO: 2;
b) A nucleotide sequence comprising SEQ ID NO: 1;
c) A nucleotide sequence which has at least about 70% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1;
d) A nucleotide sequence that hybidrizes, under stringent conditions, to SEQ. ID NO: 1 or a fragment thereof; and
e) A nucleotide sequence complementary to the nucleotide sequence of (a), (b), (c), or (d);

wherein the polynucleotide encodes a polypeptide having KAS activity.

2. An isolated polynucleotide of claim 1 comprising SEQ ID NO: 1.

3. An isolated polynucleotide of claim 1 comprising a nucleotide sequence which has at least about 70% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1.

4. An isolated polynucleotide of claim 1 comprising a nucleotide sequence which has at least about 80% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1.

5. An isolated polynucleotide of claim 1 comprising a nucleotide sequence which has at least about 90% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1.

6. An isolated polynucleotide of claim 1 comprising a nucleotide sequence which has at least about 95% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1.

7. An isolated polynucleotide of claim 1 that hybridizes, under stringent conditions, to SEQ ID NO: 1 or a fragment thereof.

8. As isolated polynucleotide according to claim 7 that hybridizes to SEQ ID NO: 1 under the following set of stringent conditions:

a) overnight incubation at 42° C in a solution comprising;

b) 50% formamide, 5X SSC;

c) 50 mM sodium phosphate;

d) 5X Denhardt's solution;.

e) 10% dextran sulfate;

f) 20 micrograms/milliliter denatured, sheared salmon sperm DNA;

g) followed by washing the hybridization support in 0.1X SSC at approximately 65 ° C .

9. A polynucleotide; wherein said polynucleotide comprises the formula:

$X-(R_1)_n-(R_2)-(R_3)_n-Y$

wherein,

at the 5' end, X is hydrogen; and

at the 3' end, Y is hydrogen or a metal;

R_1 and R_3 are any nucleic acid residue;

n is an integer between 1 and about 3000;

and R_2 is the nucleic acid sequence set forth in SEQ ID NO: 1.

10. A nucleic acid construct comprising a promoter functional in a host cell operably linked to the polynucleotide of claim 1.

11. A nucleic acid construct according to claim 10, wherein said polynucleotide is operably linked in an orientation relative to said promoter selected from the group consisting of sense and antisense.

12. A nucleic acid construct according to claim 11, wherein said polynucleotide is operably linked to a construct encoding for a desaturase enzyme.

13. The nucleic acid construct according to claim 12, wherein said construct encoding for a desaturase enzyme encodes for a delta-9 desaturase enzyme.

14. A host cell modified by introducing the nucleic acid construct of claim 10.

15. The host cell of claim 14, wherein said host cell is a plant host cell.

16. A transgenic plant, or any part thereof, comprising the host cell of claim 15.

17. The transgenic plant, or any part thereof, of claim 16, wherein said plant is selected from the group consisting of *Brassica*, soybean and corn.

18. A seed from the transgenic plant of claim 16.

19. A progeny from the transgenic plant of claim 16.

20. A seed from the progeny of claim 19.

21. A plant, or any part thereof, from the seed of claim 18.

22. A method for modifying the saturated fatty acid content in a recombinant host cell, comprising:

a) transforming or transfecting a cell;

b) wherein said cell becomes the recombinant host cell; and wherein

c) said transformation or transfection occurs with a nucleic acid construct comprising a transcriptional initiation region and a polynucleotide sequence encoding β-ketoacyl-ACP synthase;

d) such that said host cell produces a β-ketoacyl-ACP synthase and thereby modifies the saturated fatty acid content in said host cell.

23. A method for increasing the expression of β-ketoacyl-ACP synthase in a recombinant host cell, comprising:

a) transforming or transfecting a cell;

b) wherein said cell becomes the recombinant host cell; and wherein

c) said transformation or transfection occurs with a nucleic acid construct comprising a transcriptional initiation region and a polynucleotide sequence encoding β-ketoacyl-ACP synthase;

d) such that said host cell produces a β-ketoacyl-ACP synthase and thereby increases expression of β-ketoacyl-ACP synthase.

24. A method for increasing the copy number of nucleic acid constructs which encode β-ketoacyl-ACP synthase in a recombinant host cell, comprising:

a) transforming or transfecting a cell;

b) wherein said cell becomes the recombinant host cell; and wherein

c) said transformation or transfection occurs with a nucleic acid construct comprising a transcriptional initiation region and a polynucleotide sequence encoding β-ketoacyl-ACP synthase.

25. The method of claims 22, 23 or 24 wherein said β-ketoacyl-ACP synthase comprises an amino acid having at least about 70% identity to SEQ ID NO: 2.

26 The method according to claim 22 wherein said host cell is selected from the group consisting of plant cells, bacterial cells, yeast cells, and algal cells.

27. The method according to claim 22 wherein said modification of saturated fatty acids is a reduction in total saturated fatty acids.

28. The method according to claim 22, wherein said modification of saturated fatty acids is a reduction in C16:0 fatty acids.

29. The method according to claim 22, wherein said modification of saturated fatty acids is a reduction of total fatty acids to a level less than about 3.5 weight percent.

30. An oil produced by the method according to claim 29.

31. A plant according to claim 17; wherein said plant consists of a soybean seed.

32. A soybean seed according to claim 35; wherein said seed contains less than about 3.5% weight percent saturated fatty acid.

33. A plant according to claim 17; wherein said plant consists of a corn seed.

34. A corn seed according to claim 33; wherein said seed contains less than about 3.5% weight percent saturated fatty acid.

35. A plant according to claim 17; wherein said plant consists of a *Brassica* seed.

36. A *Brassica* seed according to claim 35; wherein said seed contains less than about 3.5% weight percent saturated fatty acid.